

What is claimed is:

1- A probe card having a plurality of probe needle assemblages of which the tips are brought into contact with pads on an integrated circuit for transmitting an electrical
5 signal from the IC to a tester, comprising in combination:

a plurality of primary probe segments connected by mechanical springs to conductors on a dielectric probe card substrate,

each of said primary segments including a groove and two parallel protrusions formed in the end of the segment opposite the card connection,

a fine tipped probe needle segment situated within opening in said groove and attached by a secondary mechanical spring to the primary probe segment between the parallel protrusions,

a pair of pivots connecting each of said parallel protrusions of the probe segment to the needle segment,

and the tip of each needle segment extending beyond the parallel protrusions.

20 2- A probe card as in claim 1 wherein said probe needle tips adjust vertically to compensate for height differences between probes on said card.

3- A probe card as in claim 1 wherein said probe needle
25 tips adjust vertically to compensate for thermal expansion changes.

4- A probe card as in claim 1 wherein electrical conduction between said needle tips and primary probe segment is via the pivots.

5 5- A probe needles assemblage as in claim 1 wherein said probe segments comprise tungsten.

6- A probe needle assemblage as in claim 1 wherein said probe segments comprise a copper/ tungsten alloy.

7- A probe needle assemblage as in claim 1 wherein said probe segments comprise a copper/ beryllium alloy.

10 8- An assemblage as in claim 1 wherein said probe needle tips are covered with an abrasion or oxidation resistant coating.

15 9- An assemblage as in claim 1 wherein said needle tips extending beyond the parallel protrusions by at least 0.050 inches.

10-An assemblage as in claim 1 wherein said needle tips are in the range of 0.00075 to 0.003 inches thick.

11- An assemblage as in claim 1 wherein said pivots comprise a conductive metal.

20 12- An assemblage as in claim 1 wherein said pivots are rod shaped.

13- An assemblage as in claim 1 wherein said pivots are spherical.

25 14- An assemblage as in claim 1 wherein said pivots comprise a copper alloy.

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15- An assemblage as in claim 1 wherein said secondary spring is a variable length coil.

16- An assemblage as in claim 1 wherein said secondary spring is electrically conductive.

5 17- A probe needle assemblage including in combination;
a primary ^{probe} segment having a groove with two parallel protrusions formed in one end and a mechanical spring attachment on the opposite end,

10 a fine tipped probe needle segment connected by a secondary mechanical spring to said primary probe segment between the parallel protrusions,

a pair of pivots connecting each of said parallel sides of the probe segment to the needle segment, and

15 the needle tip extending beyond the parallel protrusions.

18- A method of manufacturing a probe card having spring enhanced probe needle assemblages of which the tips are brought into contact with pads on an integrated circuit for transmitting an electrical signal from the IC to a
20 tester, including the following steps:

providing a probe card substrate having a pattern of conductors on the surface,

providing a plurality of primary probe segments having a groove and two parallel protrusions formed in one end, and

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connecting the second end by a mechanical spring to a
conductor on the card,

providing a conductive pivot member connected to each
of the protrusions, spaced equidistant from the ends of the
5 protrusions, and extending into the cavity space of the
groove,

providing a plurality of fine tipped needles greater in
length than the protrusions,

attaching the broader end of said needle tips to a
10 secondary spring, and in turn, that spring to the primary
probe segment, and

connecting the pivots to the needle segment about one
quarter to one half of the distance from the broader end of
the needle segment.

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